Shihua Gong: Curriculum Vitae

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University of Bath
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Research Interests

Linear and nonlinear solvers; wave propagation; numerical analysis; finite element methods; domain decomposition methods; multigrid methods; nonlinearly preconditioning techniques; cardiovascular fluid-structure interaction; scientific computing and computer simulation

Education

Beijing International Center for Mathematical Research, Peking University, Beijing, China
PhD in Computational Mathematics, July 2018,   Advisor: **Jinchao Xu**
Thesis: Finite element discretization and fast solvers for elastic problems

Sun Yat-sen University, Guangzhou, China
BS in Information and Computational Science, June 2013

Professional Experiences

Mar. 2019 – present Research associate, Department of Mathematical Sciences, University of Bath, UK. Mentors: Ivan Graham and Euan Spence
Aug. 2018 – Feb. 2019 Postdoctoral scholar, Department of Mathematics, Pennsylvania State University, USA. Mentor: Jinchao Xu
Mar. 2017 – Sep. 2017 Visiting student, Department of Computer Science, University of Colorado Boulder, USA. Host: Xiao-Chuan Cai
Nov. 2016 – Feb. 2017 Visiting student, Department of Mathematics, Pennsylvania State University, USA. Host: Jinchao Xu
Sep. 2015 – Mar. 2016 Visiting student, Department of Mathematics, Pennsylvania State University, USA. Host: Jinchao Xu

Publications

[1] New hybridized mixed methods for linear elasticity and optimal multilevel solvers. S. Gong, S. Wu, and J. Xu. *Numerische Mathematik*, 141.2 (2019): 569-604.

[2] A nonlinear elimination preconditioned inexact Newton method for heterogeneous hyperelasticity. S. Gong, X.-C. Cai. Accepted. *SIAM Journal on Scientific Computing* 41.5 (2019): S390-S408. APA.

[3] Interior penalty mixed finite element methods of any order in any dimension for linear elasticity with strongly symmetric stress tensor. S. Wu, S. Gong, and J. Xu. *Mathematical Models and Methods in Applied Sciences*, 27.14 (2017): 2711-2743.

[4] A nonlinear elimination preconditioned Newton's method with applications in arterial wall simulation. S. Gong, X.-C. Cai. *International Conference on Domain Decomposition Methods.* Springer, Cham, 2017.

[5] Domain-decomposition preconditioners for high-order discretizations of the heterogeneous Helmholtz equation. S. Gong, I. G. Graham, E. A. Spence, in preparation.

[6] A mathematical model of aortic aneurysm formation. W. Hao, S. Gong, S. Wu, J. Xu, M. R. Go, A. Friedman, and D. Zhu. *PloS one 12*, No. 2 (2017): e0170807.

Teaching Experiences

1. Teaching Assistant, Finite Element Methods, Pennsylvania State University, Aug. 2018 - Dec. 2018

2. Teaching Assistant, Introduction to Fluid Mechanics, Peking University, Mar. 2015 - Jul. 2015

3. Teaching Assistant, Functions of Real Variable and Functional Analysis, PKU, Sept. 2014 - Jan. 2015

4. Teaching Assistant, Linear Algebra, Peking University, Mar. 2014 - Jul. 2014

Skills

- **Programming**: Latex, C\C++, Matlab, MPI, Boost, **iFEM**, **FreeFEM++**, **FEniCS**, **PETSc**, Paraview, CMake, Gmesh, CUDA

- **Languages**: Cantonese, Mandarin, English

Presentations

- Parallel Solution Methods for Systems Arising from PDEs, CIRM, Luminy, Sept. 2019

- Contributed talk, WAVES 2019, Vienna, Aug. 2019

- Contributed talk, 28th Biennial Numerical Analysis Conference, University of Strathclyde, June, 2019

- Invited talk, Bath Numerical Analysis Seminar, University of Bath, Mar. 2019

- Joint Mathematics Meetings: Special Session on Numerical Methods for PDEs, Baltimore, Jan. 2019

- Invited talk, Inverse Problems and Analysis seminar, University of Delaware, Neward, Nov. 2018

- SIAM PP18: Highly Scalable Solvers for Computational PDEs. Waseda University, Tokyo. Mar. 2018

- Invited talk, High Performance Numerical Algorithms and Applications, TSIMF, Sanya, Jan. 2018

- The 15th Annual Meeting of CSIAM, Qindao, Oct. 2017

- Portable, Extensible Toolkit for Scientific Computation Annual Meetings, Boulder, USA, Jun. 2017

- The 18th Copper Mountain Conference on Multigrid Methods, Copper Mountain, USA, Mar. 2017

- The 9th National Finite Element Conference, E'mei, China, Aug. 2016

- The 14th Annual Meeting of CSIAM, Xiantan, Aug.2016

- Invited talk at LSEC, Chinese Academy of Sciences, Beijing, Mar. 2016

- Invited talk, CCMA PDEs and Numerical Methods Seminar, Penn State University, USA, Jan. 2016

- The 8th International Congress on Industrial and Applied Mathematics (ICIAM), Beijing, Aug. 2015